Patent claims

1. A method for visual support in the case of an electrophysiology catheter application in the heart, whereby electroanatomical 3D mapping data, provided during the performance of the catheter application, of an area of the heart to be treated are visualized, characterized in that 3D image data of a body region containing the area to be treated are recorded with a method of tomographical 3D imaging before the catheter application is carried out; the area to be treated, or significant portions of it, is extracted from the 3D image data in order to obtain selected 3D image data; and the electroanatomical 3D mapping data and the selected 3D image data are correlated and visualized next to one another in the correct position and dimension.

2. The method as claimed in claim 1, characterized in that the 3D image data of the body region are recorded with a method of X-ray computer tomography or of magnetic resonance tomography.

3. The method as claimed in claim 1, characterized in that the 3D image data of the body region are recorded by means of a 3D ultrasonic method.

4. The method as claimed in one of claims 1 to 3, characterized
in that significant portions of the area to be treated are extracted by segmenting the 3D image data in order to obtain a 3D surface profile of objects in the area which is to be treated.

5.   The method as claimed in claim 4,
characterized
in that the correlation in the correct position and dimension
is made automatically using surface matching by at least
approximately matching the 3D surface profile from the 3D image
data to a 3D surface profile from the 3D mapping data.

6.   The method as claimed in claim 4, characterized in that
the correlation with the correct position and dimension is
effected automatically in a first stage during the performance
of the catheter application by means of distinct anatomical
points or artificial markers and is refined by the surface
matching in a later second stage, in which the 3D surface
profile from the 3D image data is at least approximately
matched to a 3D surface profile from the 3D mapping data.

7.   The method as claimed in one of claims 1 to 4,
characterized
in that the correlation in the correct position and dimension
is made manually using a graphical user interface.

8.   The method as claimed in one of claims 1 to 4,
characterized
in that the correlation in the correct position and dimension
is made automatically using artificial markers which are
attached to the patient's thorax before the 3D image data are
recorded, and can be identified both in the 3D image data and
in the 3D mapping data.

9.   The method as claimed in one of claims 1 to 4,
characterized
in that the correlation in the correct position and dimension
is made automatically using distinctive anatomical points which
can be identified

both in the 3D image data and in the 3D mapping data.

10. The method as claimed in one of claims 1 to 9, characterized in that the selected 3D image data are visualized via a volume rendering technique.

11. The method as claimed in claim 10,
characterized
in that the selected 3D image data are visualized using an adjustable volume rendering transfer function.

12. The method as claimed in one of claims 1 to 9 in combination with claim 4, characterized in that the selected 3D image data are visualized as polygonal grid.

13. The method as claimed in one of claims 1 to 12, characterized
in that the two visualizations are linked to one another such that when a user rotates, moves or scales one of the visualizations the other visualization is simultaneously subjected to the same rotation, movement or scaling.

14. The method as claimed in one of claims 1 to 13, characterized
in that registration between the 3D image data and the 3D mapping data prompts a representation, contained in the 3D mapping data, of at least some of the catheter to be shown in the visualization of the selected 3D image data in real time.

15. A device for carrying out the method as claimed in one of the preceding claims, comprising

-    one or more input interfaces (14, 15) for electro-
     anatomical 3D mapping data and 3D image data,
-    an extraction module (11) which is designed to extract an
area to be treated, or significant portions of it, from the 3D
image data and provides selected 3D image data,
-    a registration module (12), connection to the extraction
module (11), which is design for correlation of the
electroanotomical 3D mapping data and the selected 3D image
data in the correct position and dimension, and
-    a visualization module (13), connected to the registration
module (12), which provides the 3D mapping data and the
selected 3D image data for visualization such that that they
can be shown in the correct position and dimension next to one
another using one or more display units (6).

16. The device as claimed in claim 15,
characterized
in that the registration module (12) has a graphical user
interface (9) which a user can use to make the correlation in
the correct position and dimension manually.

17. The device as claimed in claim 15,
characterized
in that the registration module (12) is designed for the
automatic correlation in the correct position and dimension
using artificial markers which can be identified both in the 3D
image data and in the 3D mapping data.

18. The device as claimed in claim 15,
characterized
in that the registration module (12) is designed for the
automatic correlation in the correct position and dimension
using distinctive anatomical points which can be identified
both in the 3D image data and in the 3D mapping data.

19. The device as claimed in claim 15,
characterized
in that the extraction module (11) is designed to extract the
significant portions of the area to be treated by segmenting
the 3D image data in order to obtain a 3D surface profile of
objects in the area which is to be treated.

20. The device as claimed in claim 19,
characterized
in that the registration module (12) is designed for the
automatic correlation in the correct position and dimension by
surface matching the 3D surface profile from the 3D image data
to a 3D surface profile from the 3D mapping data.

21. The device as claimed in claim 19, characterized in that
the registration module (12) is designed for automatic
correlation in the correct position with the correct dimension
in a multi-stage process, wherein the correlation in the
correct position and the correct dimension is effected by means
of distinct anatomical points or artificial markers in a
first stage and is refined by surface matching of the 3D
surfaced profile from the 3D image data to a 3D surface profile
from the 3D mapping data in a later, second stage.

22. The device as claimed in one of claims 15 to 21,
characterized in that the visualization module (13) is designed
for visualizing a part of a catheter used within the
representation of the selected 3D image data in real time.

23. The device as claimed in one of claims 15 to 22,
characterized
in that the visualization module (13) is designed so that when
a user rotates, moves or scales one of

the visualizations the other visualization is simultaneously
subjected to the same rotation, movement or scaling.